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Check List
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LISTS OF SPECIES

Pisces, Teleostei, Gobiidae, illustrated list of additions to the fauna of the Raja Ampat Islands, Indonesia

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ABSTRACT: Previous surveys of the reef-associated ichthyofauna of the Raja Ampat Islands in West Papua, Indonesia recorded a total of 1,320 species of reef fishes, including 271 species of Gobiidae. A recent survey focused on the cryptic gobies of Raja Ampat resulted in 36 new records (including nine species of both *Trimma* and *Eviota*). Sixteen of the new records are currently undescribed species, with seven of these identified as Raja Ampat endemics, while the remaining nine species are also known from localities outside Raja Ampat in the western Pacific. Five species previously recorded from the area have been re-identified, two of them representing undescribed species, and a new record from the literature has been added. This brings the total number of reef fishes known from Raja Ampat waters to 1,357, of which 308 belong to the Gobiidae. The number of species (including the undescribed taxa) apparently endemic to the Bird's Head Peninsula of West Papua now totals 33.

Introduction

Allen and Erdmann (2009) recently published a comprehensive check list of the shallow water reef fishes of the Bird's Head Peninsula of West Papua, Indonesia. Within this list, they recorded 1,320 species from the waters of the Raja Ampat Islands in the western Bird's Head, including 271 species of Gobiidae from depths down to 60 m. Details of the Bird's Head Peninsula, its component regions (including the Raja Ampat Islands), and the history of ichthyological research around these islands are summarized in Allen and Erdmann (2009).

Although that check list was based on a decade of collections and underwater observations in the Bird's Head, one component of the ichthyofauna which has not been thoroughly sampled to date is the cryptic gobies. In order to rectify this situation, Conservation International's Indonesia Marine Program sponsored a rapid survey of the cryptic goby fauna of the Raja Ampat Islands from 24 January through 3 February 2010. This brief paper is intended to complement the more extensive previous study of Allen and Erdmann (2009) by listing gobiid species not previously reported from these islands, by providing re-identification of five species in that list, and by adding one species from the literature that was overlooked in that publication.

Materials and Methods

In order to maximize the likelihood of encountering previously unrecorded cryptic gobies, the team used its extensive knowledge of the Raja Ampat area to select survey sites with an abundance of caves, overhangs or large interstitial spaces in which gobies tend to concentrate, while also consciously choosing sites exposed to a wide variety of environmental gradients (exposure, currents, freshwater influx and terrigenous sedimentation, cool-water upwelling, etc.). Surveys were conducted on SCUBA to depths of 30 m by all the authors except MVE, who regularly made collections as deep as 70 m. Specimens were collected with hand nets or in plastic bags using clove oil or rotenone. All specimens were then sorted on the ship and preserved in formalin, save for specific lots that were preserved in 95 % ethanol for future genetic analysis. Detailed microscope work on the specimens was conducted at Royal Ontario Museum (ROM) in the weeks following the survey. Photographs of each of the new records were taken of freshly collected or live specimens from Raja Ampat wherever possible, and from preserved specimens from Raja Ampat in the ROM collections where neither of the above were available. All photographs are by RW unless otherwise indicated. Lengths are given as mm of Standard Length (SL) for the photographed specimens. Institutional acronyms where voucher specimens are deposited are: NCIP – Indonesian Institute of Sciences Research Center for Oceanography (Jakarta, Indonesia); ROM – Royal Ontario Museum (Toronto, Canada); WAM – Western Australian Museum (Perth, Australia); and USNM – National Museum of Natural History (Washington, USA).

Results and Discussion

The survey was successfully conducted from 24 January through 3 February 2010, and sampled a total of 31 sites (Table 1 and Figure 1), and a subsequent visit by MVE in May 2010 added two additional new records. A total of 74 species of Gobiidae was collected during the course of the surveys, of which almost half (36) represented new records for the region (including nine species of both *Trimma* and *Eviota*). Sixteen of the new records are currently undescribed species, and although nine of these are known from other localities in the western Pacific, the other seven appear to be endemic to the Raja Ampat islands. The latter includes one undescribed species that could not be assigned to any currently known genus (see

New Genus 3 in check list below). Another species is also considered to represent an undescribed genus, but is also known from Palau (see New Genus 2 below).

The survey also allowed us to re-identify five of the goby species listed in Allen and Erdmann (2009); these are included below in the annotated check list (but they are not included in the count of 36 new records for the area).

We also note that the original description of *Trimma hayashii* Hagiwara and Winterbottom 2007 contains a record of this species from the Raja Ampat Islands (USNM 258774, 2, 16.6-17.7 mm SL, Hawaii Islet, Marchesa Bay, Batanta Island - see their Figure 7). The species is not illustrated here, as we have no specimens from the area currently available. This record was not included in Allen and Erdmann (2009). Including this previously overlooked record in the results brings the total number of fish species known from Raja Ampat waters to 1,357, of which 308 belong to the Gobiidae. Impressively for an area of this size, our study now brings the total number of species which are known only from the Bird's Head Peninsula (and hence currently considered regional endemics) to 33.

Check list of Fishes

The annotated check list of gobiid species provided below (Table 2) includes the 36 new records from this survey, as well as the five re-identifications of gobies from Allen and Erdmann's (2009) check list. For each taxon we list the scientific name and authority (if the species has been described), the island or islands where specimens were collected, and the corresponding figure number. Symbols and abbreviations used in the check list are explained as follows: an asterisk (*) indicates a re-identification of a species previously listed in the Allen and Erdmann (2009) check list; a dagger symbol (†) indicates a species which is currently known only from Raja Ampat. Unidentified species indicated as "sp." are new taxa awaiting description; within a given genus we number these new species according to the informal names used in the ROM data base. The new genera also follow the system used for the ROM data base. We have chosen to publish the check list with these unidentified species and genera included rather than wait for formal descriptions of them to appear because, given the dearth of systematists working in the area, we cannot predict how long this process will take.

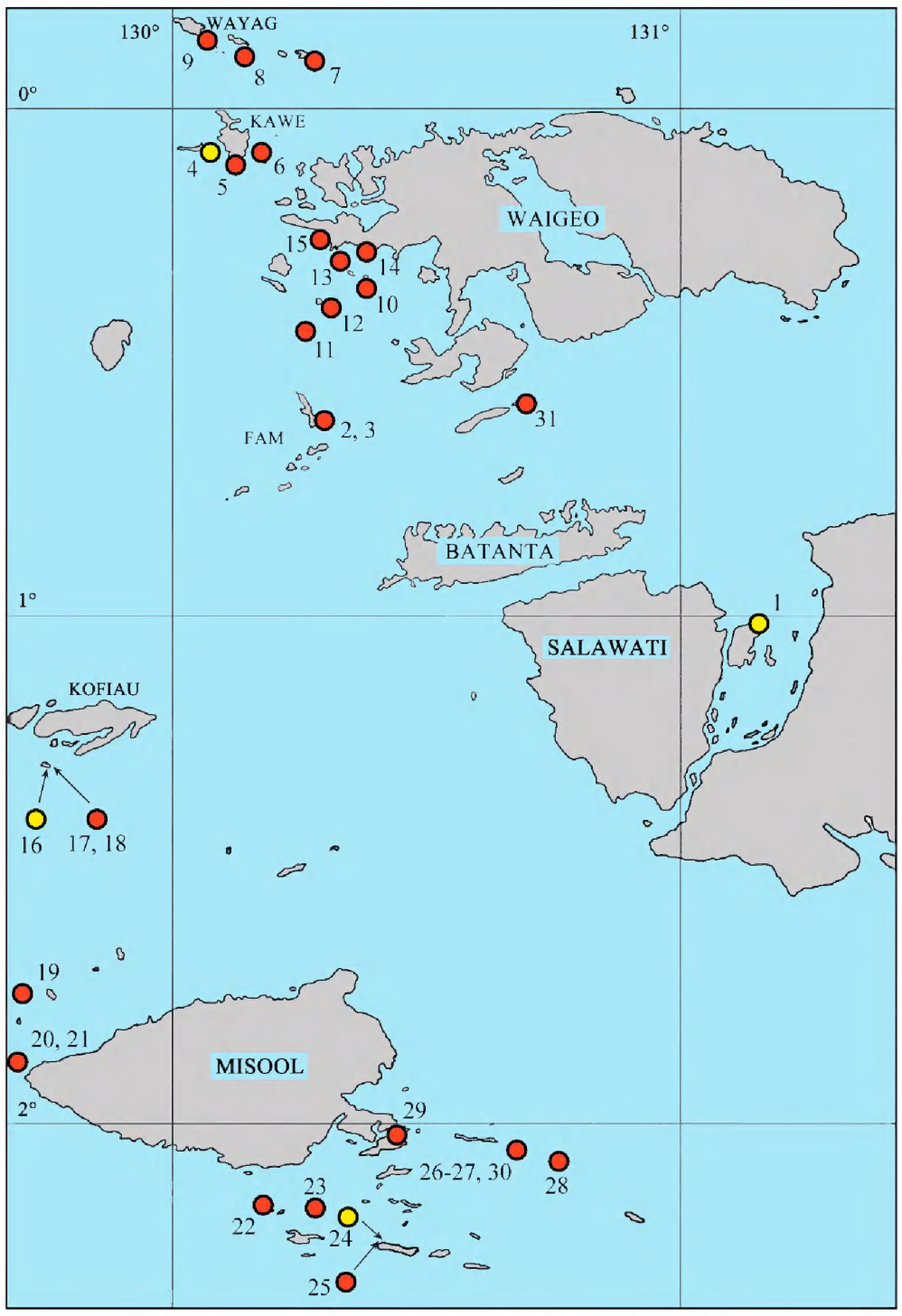

FIGURE 1. Map of the Raja Ampat islands. Numbers next to colored dots reflect the station numbers in Table 1; red dots = stations where at least one new record was collected; yellow dots = stations where no new records were present.

TABLE 1. Summary of survey sites and their coordinates from Raja Ampat goby survey 24 January – 3 February 2010.

Site No.	Site Name	Coordinates	Date
1	Matan Island	00°57.446' S, 131°08.759' E	24-Jan-10
2	Keruo Island	00°35.269' S, 130°17.685' E	25-Jan-10
3	Penemu Island	00°35.502' S, 130°17.110' E	25-Jan-10
4	Batu Hitam, Kawe Island	00°04.433' S, 130°05.200' E	26-Jan-10
5	SW Kawe Bay, Kawe Island	00°05.774' S, 130°07.119' E	26-Jan-10
6	Changgo Rock, Kawe Island	00°04.547' S, 130°10.463' E	26-Jan-10
7	Uranie Island	00°06.109' N, 130°16.548' E	27-Jan-10
8	S Quoy Island	00°07.094' N, 130°08.217' E	27-Jan-10
9	Wayag Island	00°09.059' N, 130°03.687' E	27-Jan-10
10	Mutus Island	00°21.108' S, 130°21.521' E	28-Jan-10
11	Fwojo Island	00°24.125' S, 130°13.861' E	28-Jan-10
12	Jef Tsiep Island	00°22.127' S, 130°17.089' E	28-Jan-10
13	Tg Manare, Waigeo Island	00°16.598' S, 130°18.974' E	29-Jan-10
14	Waisilip, Waigeo Island	00°15.490' S, 130°21.447' E	29-Jan-10
15	Wofoh Island	00°15.362' S, 130°17.536' E	29-Jan-10
16	Walo Island	01°16.797' S, 129°39.864' E	30-Jan-10
17	Walo Island Bommies	01°16.260' S, 129°40.088' E	30-Jan-10
18	SW Kofiau Island	01°15.864' S, 129°40.789' E	30-Jan-10
19	Mas Mas Ulit Seamount	01°39.832' S, 129°43.834' E	31-Jan-10
20	Nampale Island	01°47.941' S, 129°37.421' E	31-Jan-10
21	Kanari Island	01°49.536' S, 129°38.262' E	31-Jan-10
22	SE Waaf Island	02°08.936' S, 130°13.283' E	1-Feb-10
23	Kepotsol Island	02°09.649' S, 130°17.596' E	1-Feb-10
24	N Wayil Island	02°11.722' S, 130°25.632' E	1-Feb-10
25	S Wayil Island	02°12.283' S, 130°25.165' E	1-Feb-10
26	Balbulol Island	02°01.509' S, 130°41.437' E	2-Feb-10
27	Balbulol Island Strait	02°01.584' S, 130°41.431' E	2-Feb-10
28	Ef Pian Island	02°02.478' S, 130°46.696' E	2-Feb-10
29	Mesempta, SE Misool Island	01°58.700' S, 130°27.957' E	3-Feb-10
30	Wasankaini Island	02°01.507' S, 130°41.845' E	3-Feb-10
31	Kri Island	00°33.391' S, 130°41.417' E	3-Feb-10

Table 2. Annotated list of gobiid species newly recorded from Raja Ampat.

Asterropteryx ensifera (Bleeker 1874). Fwojo Is. [ROM]. Figure 2A.
Cabillus lacertops Smith 1959. Mutus Is. [ROM]. Figure 2B.
Callogobius crassus McKinney and Lachner 1984. Waigeo Is. [ROM]. Figure 2C.
Eviota korechika Shibukawa and Suzuki 2005. Changgo Rock, Kawe Is., Balbulol Is., Ef Pian Is., Fwojo Is., Mesempta Is., Mutus Is., Penemu Is., S. Quoy Is., Waigeo Is., Wayag Is., Wayil Is., Wasankaini Is., Wofoh Is. [ROM]. Figure 2D.
Eviota Palau sp. 2. Wayil Is. [ROM]. Figure 2E.
Eviota Palau sp. 3. Keruo Is. [ROM]. Figure 2F.
Eviota Palau sp. 6. Wasankaini Is. [ROM]. Figure 2G.
Eviota Palau sp. 8. Balbulol Is., Keruo Is. [ROM]. Figure 2H.
Eviota Raja Ampat sp. 1*. Listed as "*Eviota* sp. 1" in Allen and Erdmann (2009). Waigeo Is. [ROM, WAM]. Figure 2I.
Eviota Raja Ampat sp. 2†. Waigeo Is. [WAM]. Figure 2J.
Eviota Raja Ampat sp. 3†. Uranie Is. [ROM]. Figure 2K.
Eviota shimadai Greenfield and Randall 2010. Ef Pian Is., Fwojo Is., Mutus Is., Walo Is., Wofoh Is. [ROM]. Figure 2L.
Eviota winterbottomi Greenfield and Randall 2010. Balbulol Is., Changgo Rock, Ef Pian Is., Kanari Is., Mas Mas Ulit Seamount, Mutus Is., Nampale Is., S. Quoy Is., Wayil Is., Wasankaini Is. [ROM]. Figure 2M.
Fusigobius gracilis (Randall 2001). Mutus Is., Walo Is. [ROM]. Figure 2N.
Fusigobius humeralis (Randall 2001). SW Kawe Bay. [ROM]. Figure 3A.
Gobiodon acicularis Harold and Winterbottom 1995. Kri Is. [WAM]. Figure 3B.
Hetereleotris Raja Ampat sp. 1†. Walo Is. [ROM]. Figure 3C.
New Genus 2, Palau sp. 1. Kepotsol Is., Wayag Is., Wayil Is. [ROM]. Figure 3D.
New Genus 3, Raja Ampat sp. 1†. Waigeo Is. [ROM]. Figure 3E.
Priolepis nocturna (Smith 1957). Kofiau Is. [ROM]. Figure 3F.
Sueviota aprica Winterbottom and Hoese 1988. Kepotsol Is., Walo Is. [ROM]. Figure 3G.
Sueviota lachneri Winterbottom and Hoese 1988. Balbulol Is., Penemu Is., Wayil Is. [ROM]. Figure 3H.
Trimma annosum Winterbottom 2003. Ef Pian Is., Kawe Is., Nampale Is., Penemu Is., Quoy Is., Uranie Is. [ROM]. Figure 3I.
Trimma gigantum Winterbottom and Zur 2007*. Identified as "*Trimma* sp. 2" in Allen and Erdmann (2009). Keruo Is. [ROM]. Figure 3J.
Trimma marinae Winterbottom 2005*. Identified as "*Trimma griffithsi* Winterbottom 1984", in Allen and Erdmann (2009). Jef Tsiep Is., Kepotsol Is., Mesempta (Misool Is.), Waigeo Is., Wofoh Is. [ROM]. Figure 3K.
Trimma milta Winterbottom 2002. Keruo Is., S. Quoy Is. [ROM]. Figure 3L.
Trimma nasa Winterbottom 2005. Kepotsol Is. [ROM]. Figure 3M.
Trimma preclarum Winterbottom 2006. Kawe Is., Waigeo Is. [ROM]. Figure 3N.
Trimma RW sp. 51*. Identified as "*Trimma* sp. 7" in Allen and Erdmann (2009). Jef Tsiep Is., Mutus Is., Waigeo Is., Wofoh Is., Waaf Is. [NCIP, ROM, WAM]. Figure 4A.
Trimma RW sp. 68. Specimens of this species form part of the record of *Trimma anaima* reported by Allen and Erdmann (2009), together with specimens of the true *T. anaima*. Balbulol Is., Jef Tsiep Is., Kawe Is., Kepotsol Is., Waigeo Is., Wofoh Is. [NCIP, ROM, WAM]. Figure 4B.
Trimma RW sp. 93. Kawe Is. [NCIP, ROM, WAM]. Figure 4C.
Trimma RW 94. Specimens of this species were included in the record of *Trimma tevegae* in Allen and Erdmann (2009). Balbulol Is., Jef Tsiep Is., Kepotsol Is., Keruo Is., Mutus Is., Waigeo Is., Wayil Is., Wofoh Is. [NCIP, ROM, WAM]. Figure 4D.
Trimma RW sp. 95†. Keruo Is. [NCIP, ROM]. Figure 4E.
Trimma RW sp. 96†. Keruo Is. [NCIP, ROM]. Figure 4F.
Trimma sheppardi Winterbottom 1984*. Identified as "*Trimma* sp. 4 (*cf. sheppardi*)" in Allen and Erdmann (2009). Walo Is. [WAM]. Figure 4G.
Trimmatom nanus Winterbottom and Emery 1981. Walo Is. [ROM]. Figure 4H.
Trimmatom RW sp. 7. Kanari Is. [ROM]. Figure 4I.
Trimmatom sagma Winterbottom 1989. Keruo Is. [ROM]. Figure 4J.
Trimmatom zapotes Winterbottom 1989. Mesempta (Misool Is.), Wasankaini Is. [ROM]. Figure 4K.
Tryssogobius Raja Ampat sp. 1†. Waigeo Is. [ROM]. Figure 4L.
Valenciennea limicola Hoese and Larson 1994. Waigeo Is. [WAM]. Figure 4M.

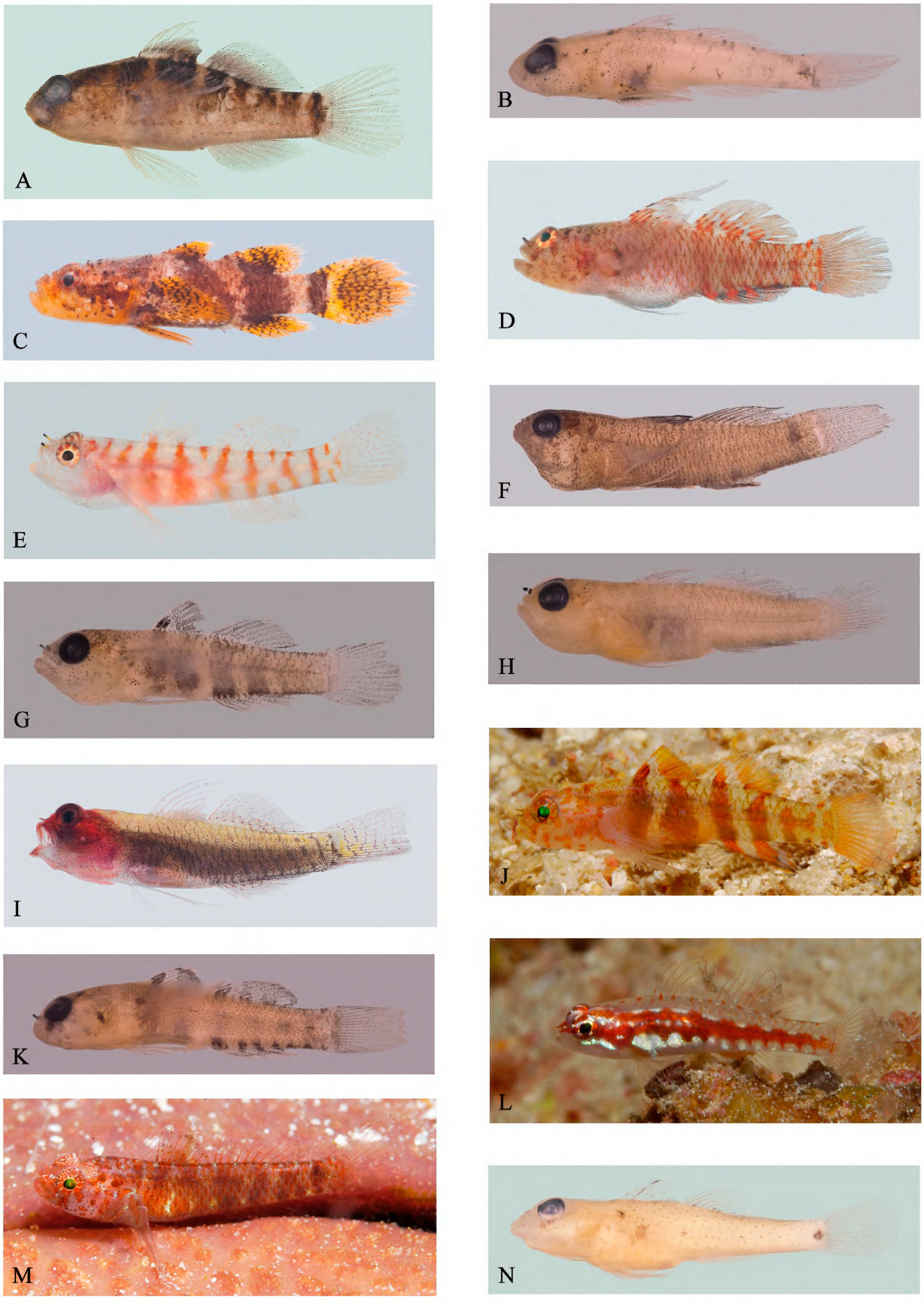

FIGURE 2. A. *Asterropteryx ensifera* (preserved), 17.5 mm, ROM 85127, Kepotsol Is.; **B**. *Cabillus lacertops* (preserved), 16.2 mm, ROM 85098, Mutus Is.; **C**. *Callogobius crassus*, 15.1 mm, ROM 85170, Waigeo Is.; **D**. *Eviota korechika*, 20.5 mm, ROM 85069, S. Quoy Is.; **E**. *Eviota* Palau sp. 2, 16.1 mm, ROM 85364, Wayil Is.; **F**. *Eviota* Palau sp. 3 (preserved), 12.4 mm, ROM 84880, Penemu Is.; **G**. *Eviota* s Palau sp. 6 (preserved), 8.2 mm, ROM 87458, Balbulol Is.; **H**. *Eviota* sp. 8 (preserved), 15.2 mm, ROM 85399, Balbulol Is.; **I**. *Eviota* Raja Ampat sp. 1, 11.7 mm, ROM 85198, Waigeo Is.; **J**. *Eviota* Raja Ampat sp. 2, (live, not collected), Waigeo Is., G. R. Allen; **K**. *Eviota* Raja Ampat sp. 3 (preserved), 10.0 mm, ROM 85058, Uranie Is.; **L**. *Eviota shimadai*, (live, not collected), Waigeo Is., G. R. Allen; **M**. *Eviota winterbottomi*, (live, not collected), Waigeo Is., G. R. Allen; **N**. *Fusigobius gracilis* (preserved), 25.4 mm, ROM 85103, Mutus Is.

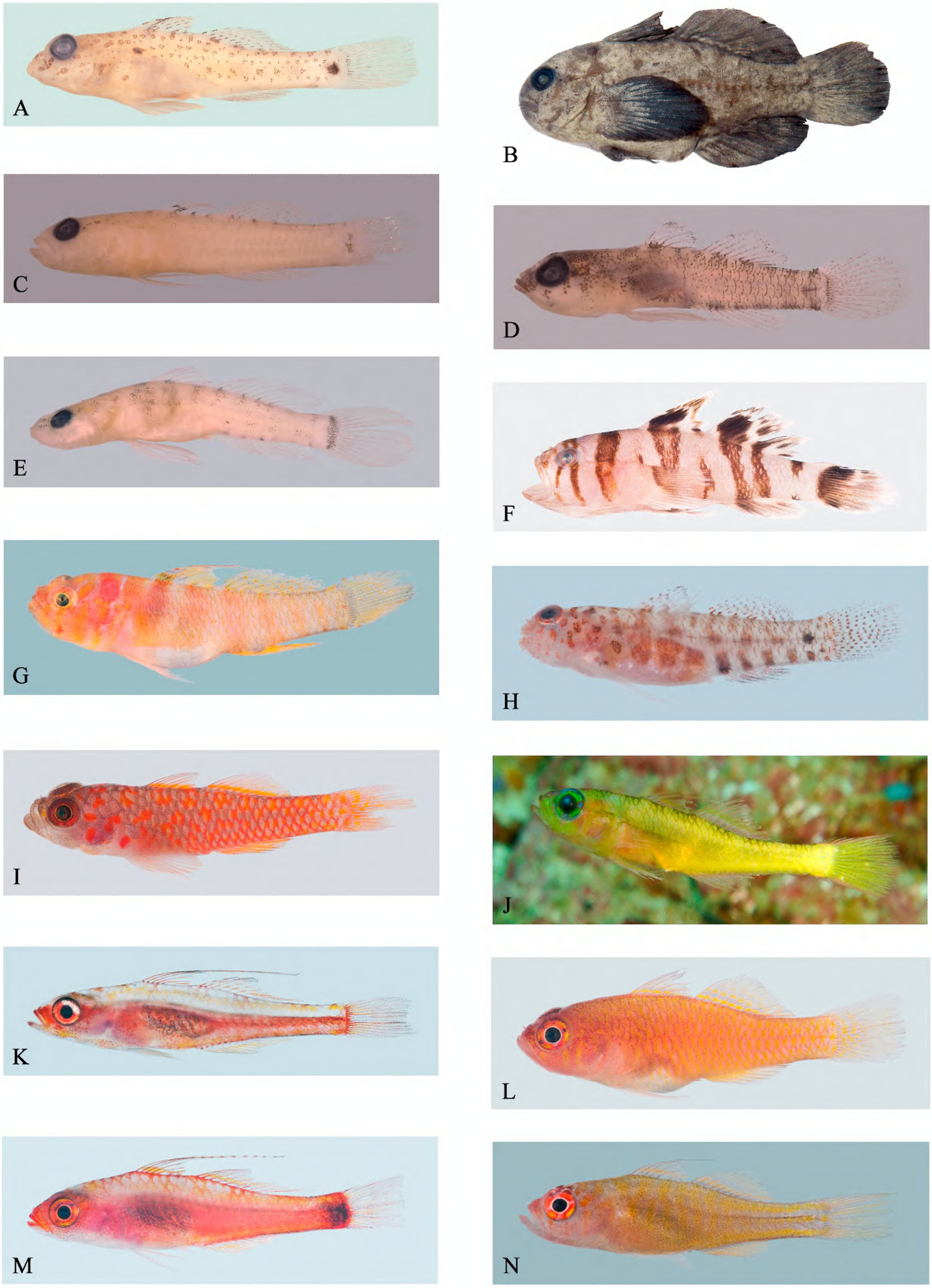

Figure 3. A. *Fusigobius humeralis* (preserved), 19.7 mm, ROM 85108, Kawe Is.; **B**. *Gobiodon acicularis* (preserved), WAM uncatalogued. Kri Is., G. R. Allen.; **C**. *Hetereleotris* Raja Ampat sp. 1, (preserved), 14.9 mm, ROM 85247, Walo Is.; **D**. New Genus 1, Palau sp. 1 (preserved), 7.8 mm, ROM 85338, Kepotsol Is.; **E**. New Genus 2, Raja Ampat sp. 1 (preserved), 15.7 mm, ROM 85175, Waigeo Is.; **F**. *Priolepis nocturna*, 26.3 mm, ROM 85263, Kofiau Is.; **G**. *Sueviota aprica*, 14.4 mm, ROM 85262, Walo Is.; **H**. *Sueviota lachneri*, 14.3 mm, ROM 84921, Batu Hitam, Kawe Is.; **I**. *Trimma annosum*, 17.0 mm, ROM 85169, Kawe Is.; **J.** *Trimma gigantum*, 22.9 mm, ROM 84888, Penemu Is., M. V. Erdmann; **K.** *Trimma marinae*, 18.1 mm, ROM 85153, Waigeo Is.; **L**. *Trimma milta*, 17.6 mm, ROM 85066, S. Quoy Is.; **M**. *Trimma nasa*, 19.5 mm, ROM 85321, Kepotsol Is.; **N**. *Trimma preclarum*, 15.7 mm, ROM 85160, Waigeo Is.

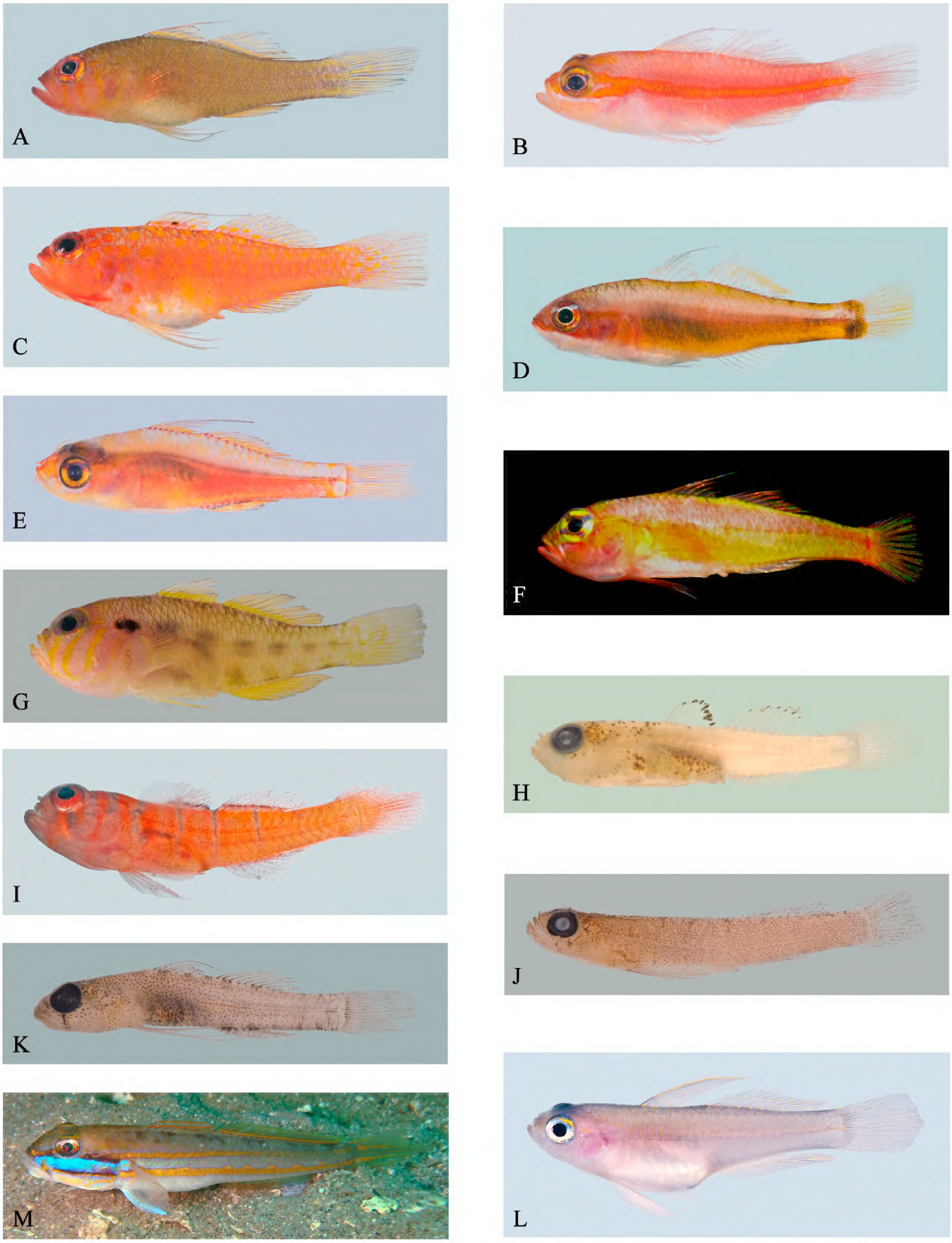

Figure 4. A. *Trimma* RW sp. 51, 20.0 mm, ROM 85197, Waigeo Is.; **B**. *Trimma* RW sp. 68, 20.3 mm, ROM 58186, Waigeo Is.; **C**. *Trimma* RW sp. 93, 22.8 mm, ROM 85034, Kawe Is.; **D**. *Trimma* RW sp. 94, 20.7 mm, ROM 85155, Waigeo Is.; **E**. *Trimma* RW sp. 95, 17.0 mm, ROM 84881, Penemu Is.; **F**. *Trimma* RW sp. 96, 25.9 mm, ROM 87480, Keruo Is., M. V. Erdmann; **G**. *Trimma sheppardi*, WAM uncatalogued, Walo Is., M. V. Erdmann; **H**. *Trimmatom nanus* (preserved), 8.3 mm, ROM 85243, Walo Is.; **I**. *Trimmatom* RW sp. 7, 9.3 mm, ROM 85299, Nampale Is.; **J**. *Trimmatom sagma* (preserved), 13.3 mm, ROM 84897, Penemu Is.; **K**. *Trimmatom zapotes* (preserved), 12.5 mm, ROM 87448, Misool Is.; **L**. *Tryssogobius* Raja Ampat sp. 1, 25.5 mm, ROM 85185, Waigeo Is.; **M**. *Valenciennea limicola* (image reversed; live, not collected). Waigeo Is., M. V. Erdmann.

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